

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patentee: Shen et al.

Assignee: Atwood Mobile Products, Inc.

U.S. Patent No.: 5,650,054 Date Issued: July 22, 1997

Application No.: 522,946 Date Filed: September 1, 1995

Title: **LOW-COST ROOM TEMPERATURE CARBON MONOXIDE AND  
TOXIC GAS SENSOR WITH HUMIDITY COMPENSATION  
BASED ON PROTONIC CONDUCTIVE MEMBRANES**

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Mail Stop Reissue  
Commissioner for Patents  
P.O. Box. 1450  
Alexandria, VA 22313-1450

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REISSUE APPLICATION DECLARATION BY THE ASSIGNEE

Dear Sir:

I, David Bovee, hereby declare that:

1. Dura Automotive Systems, Inc. is authorized to act on behalf of Atwood Mobile Products, Inc. Atwood Industries, Inc. made a capital contribution of all its assets to Atwood RV Products, Inc. Atwood RV Products, Inc. merged with two other companies and subsequently changed its name to Atwood Mobile Products, Inc. I am authorized to act on behalf of Dura Automotive Systems and the title of my position with Dura Automotive Systems, Inc. is Vice President.

2. This declaration is being filed to complete the requirements for filing a reissue application for the above-referenced patent. I understand that the assignee of entire interest is authorized to make this declaration for reissue application under 37 C.F.R. § 1.172(a) because the reissue application is not seeking to enlarge the scope of the claims.

3. I believe the inventors to be the original and first inventors of the subject matter that is described and claimed in the above-referenced patent, for which a reissue patent is sought on the invention referenced above.

4. A copy of the specification, figures, abstract and claims of U.S. Patent No. 5,650,054 is attached hereto.

5. I have reviewed and understand the contents of the specification, figures, abstract and claims of the above-referenced patent and the claims presented in the preliminary amendment filed with this declaration.

6. A chart showing the differences in claim language between the original patent claims and claims 66-75 presented in the reissue application is attached to this declaration. Because presented reissue claims 1-65 are exactly the same as original patent claims 1-65, respectively, these claims have been omitted from the chart.

7. I acknowledge my duty to disclose information that is material to patentability as defined in 37 C.F.R. § 1.56.

8. I verily believe the original patent to be wholly or partly inoperative or invalid by reason of the patentee claiming less than he had the right to claim in the patent.

In particular, patentee failed to claim a two-electrode electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising: a sensing electrode permeable to water vapor and comprised of an electrical conducting material

and having a surface exposed to the ambient atmosphere; a counter electrode permeable to water vapor and comprised of an electrical conducting material; a first protonic conductive electrolyte membrane permeable to water vapor and situated between and in contact with the sensing and counter electrodes, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode; means for electrical measurement electrically connected to said sensing and counter electrodes; means, containing a volume of water vapor, for exposing a surface of said counter electrode to said water vapor, wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without any deceptive intention on the part of the patentee.

Patentee also failed to claim an electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising: a sensing electrode permeable to water vapor and comprised of an electrical conducting material and having a surface exposed to the ambient atmosphere; a counter electrode permeable to water vapor and comprised of an electrical conducting material; a first protonic conductive electrolyte membrane permeable to water vapor and situated between and in contact with the sensing and counter electrodes, the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode; means for electrical measurement electrically connected to said sensing and counter electrodes; means, containing a volume of water vapor, for exposing a surface of said counter electrode to said water vapor, wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second

electrical conductor material; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without any deceptive intent on the part of the patentee.

Patentee also failed to claim a two-electrode electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising: a sensing electrode permeable to water vapor and comprised of an electrical conducting material and having a surface exposed to the ambient atmosphere; a counter electrode permeable to water vapor and comprised of an electrical conducting material; a first protonic conductive electrolyte membrane permeable to water vapor and situated between and in contact with the sensing and counter electrodes, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode; means for electrical measurement electrically connected to said sensing and counter electrodes; means, containing a volume of water vapor, for exposing a surface of said counter electrode to said water vapor, wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without any deceptive intent on the part of the patentee.

Patentee also failed to claim an electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising: a sensing electrode permeable to water vapor and comprised of an electrical conducting material and having a surface exposed to the ambient atmosphere; a counter electrode permeable to water vapor and comprised of an electrical conducting material; a first protonic conductive electrolyte membrane permeable to water vapor and situated between and in contact with the sensing and counter electrodes, the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane; means for electrical

measurement electrically connected to said sensing and counter electrodes; means, containing a volume of water vapor, for exposing a surface of said counter electrode to said water vapor, wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without deceptive intent on the part of the patentee.

Patentee also failed to claim an electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising: a sensing electrode permeable to water vapor and comprised of an electrical conducting material and having a surface exposed to the ambient atmosphere; a counter electrode permeable to water vapor and comprised of an electrical conducting material; a first protonic conductive electrolyte membrane permeable to water vapor and situated between and in contact with the sensing and counter electrodes, the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane and the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane; means for electrical measurement electrically connected to said sensing and counter electrodes; means, containing a volume of water vapor, for exposing a surface of said counter electrode to said water vapor, wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without deceptive intent on the part of the patentee.

Patentee also failed to claim an electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising: a sensing electrode permeable to water vapor and comprised of an electrical conducting material and having a surface exposed to the ambient atmosphere; a counter electrode permeable to water vapor and comprised of an

electrical conducting material; a first protonic conductive electrolyte membrane permeable to water vapor and situated between and in contact with the sensing and counter electrodes, the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode; means for electrical measurement electrically connected to said sensing and counter electrodes; means, containing a volume of water vapor, for exposing a surface of said counter electrode to said water vapor, wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without deceptive intent on the part of the patentee.

Patentee also failed to claim an electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising: a sensing electrode permeable to water vapor and comprised of an electrical conducting material and having a surface exposed to the ambient atmosphere; a counter electrode permeable to water vapor and comprised of an electrical conducting material; a first protonic conductive electrolyte membrane permeable to water vapor and situated between and in contact with the sensing and counter electrodes, the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode; means for electrical measurement electrically connected to said sensing and counter electrodes; means, containing a volume of water vapor, for exposing a surface of said counter electrode to said water vapor, wherein the electrical conducting material of at least one of

said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without deceptive intent on the part of the patentee.

Patentee also failed to claim a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising: a sensing electrode permeable to water vapor and comprised of an electrical conducting material and having a surface exposed to the ambient atmosphere; a counter electrode permeable to water vapor and comprised of an electrical conducting material; a first protonic conductive electrolyte membrane permeable to water vapor and situated between and in contact with the sensing and counter electrodes; means for electrical measurement electrically connected to said sensing and counter electrodes; means, containing a volume of water vapor, for exposing a surface of said counter electrode to said water vapor, wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage. Such error arose without deceptive intent on the part of the patentee.

Patentee also failed to claim a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising: a sensing electrode permeable to water vapor and comprised of an electrical conducting material and having a surface exposed to the ambient atmosphere; a counter electrode permeable to water vapor and comprised of an electrical conducting material; a first protonic conductive electrolyte membrane permeable to water vapor and situated between and in contact with the sensing and counter electrodes, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane; means for electrical measurement electrically connected to said sensing and counter electrodes; means, containing a volume of water vapor, for exposing a surface of

said counter electrode to said water vapor, wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage. Such error arose without deceptive intent on the part of the patentee.

Patentee also failed to claim a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising: a sensing electrode permeable to water vapor and comprised of an electrical conducting material and having a surface exposed to the ambient atmosphere; a counter electrode permeable to water vapor and comprised of an electrical conducting material, the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode; a first protonic conductive electrolyte membrane permeable to water vapor and situated between and in contact with the sensing and counter electrodes; means for electrical measurement electrically connected to said sensing and counter electrodes; means, containing a volume of water vapor, for exposing a surface of said counter electrode to said water vapor, wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage. Such error arose without deceptive intent on the part of the patentee.

9. All errors corrected in the reissue application arose without deceptive intention on the part of the Applicant.



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10. All statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

7 July 2003

Dated



David Bovee

Vice President, Dura Automotive Systems, Inc.